

STEREO MOC Status Report  
Time Period: 2016:284 - 2016:290

STEREO Ahead (STA) Status:

1. The following Ground System anomalies/events occurred during this reporting period:

- On day 284, during the DSS-25 support, turbo decoder lock was lost briefly at 1638z. This anomaly resulted in the loss of one frame of SSR data.
- On day 285, during the DSS-55 support, turbo decoder lock was lost briefly at 0908z and again at 0911z. This anomaly resulted in the loss of two frames of SSR data.
- On day 286, during the DSS-65 support, turbo decoder lock was lost briefly at 1239z. This anomaly resulted in the loss of one frame of SSR data.
- On day 290, during the DSS-43 support, turbo decoder lock was lost briefly at 2205z. This anomaly resulted in the loss of 99 frames of SSR data and 2 frames of real-time data.

2. The following spacecraft/instrument events occurred during this week. The Ahead observatory operated nominally during this week.

- On day 284, the 92<sup>nd</sup> momentum dump was executed successfully at 2345z, which imparted an estimated delta V of 0.096 m/sec. This was the 11<sup>th</sup> momentum dump that did not use the IMU. After thruster operations completed, there was a 0.45 degree of roll angle error which was dampened out over the next 7.2 minutes. Fine pointing stabilized 2.3 minutes after completion of the momentum dump.
- On day 290, the SECCHI instrument reset at 19:05:57z. The SECCHI team reconfigured the instrument to operational mode by 291-0000z. This was the 42<sup>nd</sup> reset of SECCHI on the Ahead observatory.
- The average daily science data return for Ahead was 5.5 Gbits during this week.

## STEREO Behind (STB) Status:

1. Behind loss of communication anomaly occurred on October 1, 2014. Active recovery operations began with carrier detection by the DSN on August 21<sup>st</sup>, through September 23, 2016. At a spacecraft range of 2 AU, the observatory was found to be rotating slowly about its principal axis of inertia for which the uncontrolled attitude allowed some solar array input and continuous uplink and downlink communications on the LGA at emergency data rates. Over the next 22 continuous days, significant obstacles to recovery were overcome with a coordinated effort of the engineering team, NASA GSFC, DSN, FDF, SSMO scheduling, and Mission Operations teams. This consisted of:

- Reliably commanding a rotating spacecraft with uncontrolled attitude at a distance of 2 AU
- How to power on the spacecraft that was never designed to be off without collapsing the battery voltage
- Acquiring telemetry at 35 bps from a spacecraft that is rotating with an uncontrolled attitude
- Warming a frozen propulsion subsystem with a degraded battery (2 out of 11 cells not functioning) and limited solar array input with an uncontrolled attitude
- Configuring, loading, and verifying EA, C&DH, and G&C parameters and macros with very limited telemetry
- Conducting an autonomous momentum dump in the blind and transitioning to C&DH standby mode and successfully receiving telemetry indicating star tracker lock and decreasing system momentum.

However, system momentum level remained above the threshold for re-establishing attitude control with the reaction wheels. Due to the uncontrolled attitude, communication degraded and the last detection of the carrier was on September 23<sup>rd</sup>.

Behind Observatory Status - From the last telemetry received on September 18<sup>th</sup>, main bus voltage is low, 2 (#6 & 9) out of 11 battery cells are currently not functioning, attitude uncontrolled, rotating at a ~45 second period about its principal axis of inertia. While propellant is suspected to be frozen, both propulsion tank latch valves are open and pressure transducer #2 is not functioning. EA mode is enabled. The battery charge rate is C/10. Necessary macro sequences have been tested to allow the peak power tracker in C&DH standby mode to protect the battery. These macro sequences

will be loaded to EEPROM when the communications supports longer commands.

Monthly recovery efforts will consist of attempting to power on the TWTA for 30 minutes. If no carrier signal is detected, battery recovery operations will commence which consist of repeatedly sweeping a 3 kHz uplink range and sending commands for IEM switched power and PDU 1553 interface bus off.

2. Detailed status of the recovery activities this week to restore operations are listed below.

- None.